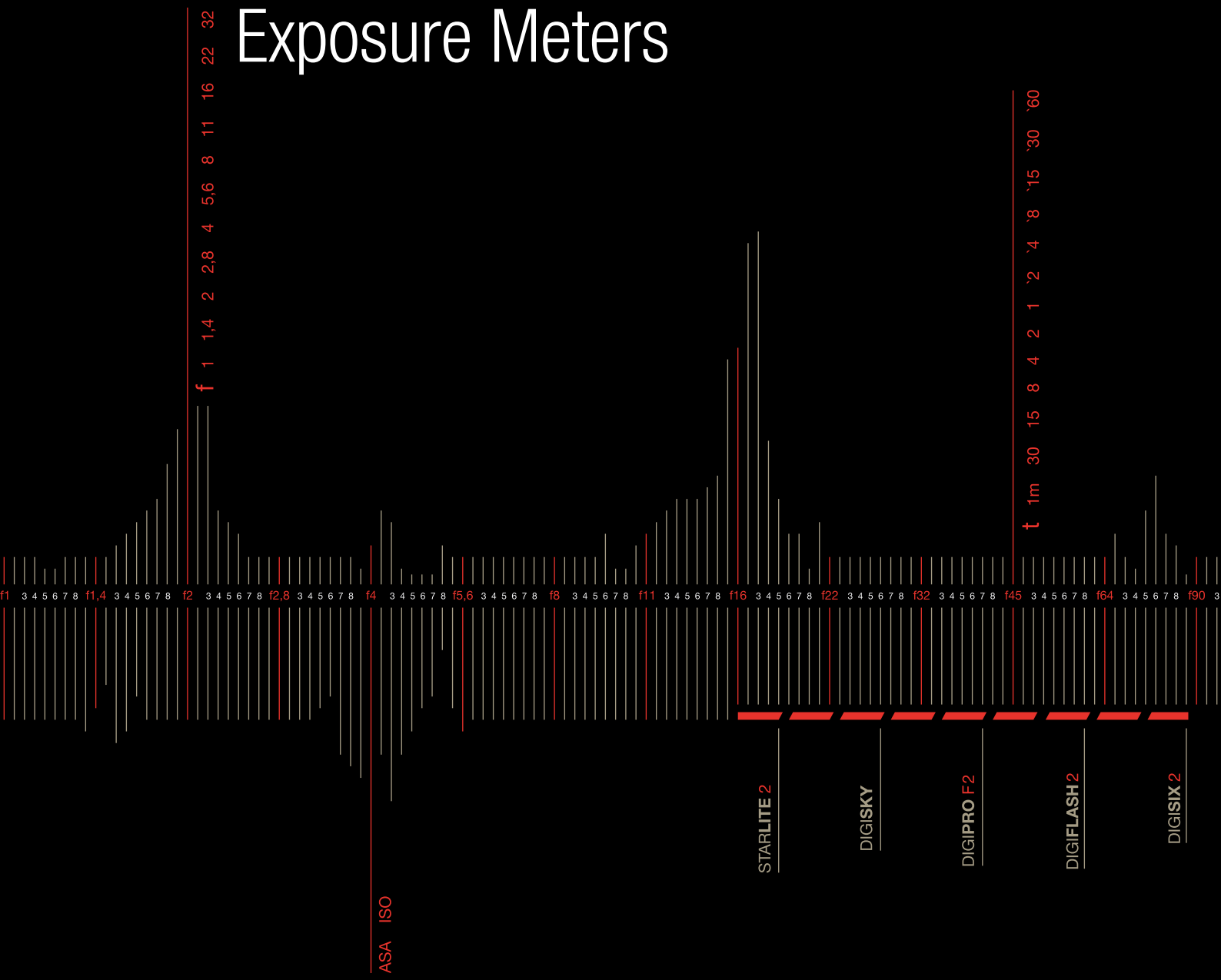
GOSSEN

Exposure Meters



LIGHT IS

WHAT YOU MAKE OF IT

Successful photographers compose their images with light!

The interplay of light can be a source of either frustration or inspiration for photographers – depending on the photographic situation. Essentially, photography attempts to create moods by interpreting or influencing incident light at the scene and capture them with the help of photographic techniques. Precise, repeatable exposure plays a significant role in this respect and may not be left to chance.

Handheld exposure meters are image composition tools whose possibilities by far exceed those of the measuring systems included in the camera – for, thanks to precise incident light measurement with spherical or flat diffuser, flash measurement with evaluation of the incident light ratio, differentiated contrast measurement and mean value generation, as well as spot metering independent of focal length and measurement in accordance with the zone system.

The diverse exposure options and extensive information provided by modern camera systems would appear to make external exposure meters superfluous. However, closer examination reveals that this information is only conditionally meaningful for an evaluation of correct exposure. The histogram merely depicts the distribution of tonal values within the image and must be interpreted depending upon the subject, as well as lighting. The photographer needs lots of practice and experience to this end. Visual control at the uncalibrated camera display, which is only effective to a given extent in bright ambient light, only reveals grossly incorrect exposure settings. The image frequently has an entirely different appearance in a calibrated monitor. Subsequent correction options available at the computer are time consuming, are incapable of replacing missing detail in highlighted areas and shadows, and represent a direct contradiction to the dynamic workflow associated with digital photography.

With more than 75 years of experience in the production of exposure meters, we at GOSSEN are well aware of the bright and dark sides of photography. We support all photography enthusiasts in making the best of any lighting situation. The foundation of a brilliant photo is laid by means of high imaging quality, of which correct exposure is an essential component.

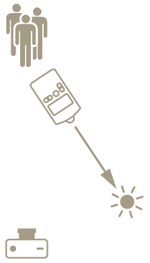
MEASUREMENT METHOD

Reflected Light Measurement

Where reflected light measurement is concerned, the exposure meter acquires light reflected from the object to the camera from the standpoint of the photographer. This value, based on all of the various reflective objects within the image, is used as a mean tonal value for which required exposure is calculated. Tonal range, color, contrast, background brightness, surface structure and reflectivity of the objects influence the measurement results, although they are not taken into consideration in evaluating the subject.

Monochrome subjects are reproduced in neutral gray with this measuring method. A bright subject reflects more light and is represented as darker. A dark subject reflects less light, and is thus represented as brighter. In other words, if a white and a black car are photographed, both images will depict the same gray car.

Reflected light measurement of a gray chart in close proximity to the subject delivers more precise results because the gray chart reflects exactly the same light component to which the exposure meter is calibrated. However, this measurement is complicated and in many cases impractical.



Incident Light Measurement

External exposure meters allow for high precision incident light measurement, which is interesting for portrait, object and fashion photography. They measure and analyze light which strikes the subject, regardless of its reflectivity. Complete control of lighting contrast leads to well-balanced exposure results and allows for targeted use of the available dynamic range. And the meter only takes illuminance into consideration – not object brightness. The user is able to count on obtaining correct evaluation, as well as good results, with both brighter than average and darker than average subjects: optical influences which could lead to erroneous measurement data are eliminated automatically by external exposure meters. Even objects which greatly deviate from the middle gray tone are reproduced with correct color and tonal values, as long as white balancing is correctly executed for the digital camera.

Spot Metering

Spot metering is frequently integrated into modern reflex cameras, for which the measuring range is indicated as a percentage of the image area (sensor). The angle of acceptance depends on, and changes along with, the lens's focal length. External spot meters have a fixed, 1° angle of acceptance and are capable of measuring small areas very accurately within a complex scene, and it's also possible to generate a mean value by taking several measurements.

Spot metering is used when unreliable values are provided by reflected light measurement or where incident light measurement is not possible. As a rule, this involves scenes with objects at a great distance, backlighting situations, extreme differences in brightness, reflective surfaces or a moving main subject.

Flash Measurement

Where several flash units or a combination of ambient light and flash is used, exposure meters which are integrated into the camera are inadequate, because all of the sources of light which illuminate the scene have to be individually evaluated and added up. External exposure meters are capable of measuring individual flashes, calculating multiple flashes in the event of insufficient flash power, and analyzing the ratio of flash to ambient light – even where several sources of light interact with each other. A second, and much greater benefit, results from using the meter to adjust the lighting conditions of the individual sources of light to each other. This makes it possible to use flash as a creative means, and to set up any desired lighting mood quickly and repeatedly with any flash system and light shaper. Evaluation of the ambient light ratio makes it possible to adjust fill-in flash for outdoor use, or as the main source of light. Tedious experiments with the power settings of individual flash units are thus a thing of the past.

Contrast Measurement

Subject contrast designates the ratio between the brightest and the darkest portions of the subject which are important to the image. This is ascertained by means of close-up or spot metering and is specified in exposure values or f-stop steps. One exposure value is equal to one full f-stop. Subject contrast is the result of different reflective characteristics of individual portions of the subject, and lighting.

If subject contrast exceeds the dynamic range of the recording medium, i.e. the total number of brightness levels which the medium is capable of reproducing. The bright or dark parts of the subject appear showing no detail and cannot be improved by means of post-processing. An overview of the dynamic ranges of various recording and reproduction media are listed below.

Recording Medium		Dynamic Range [EV / f-stops]
Digital reflex camera	100 ASA	10
	400 ASA	9
Digital compact camera	100 ASA	8,5 … 9
	400 ASA	7,5
Black-and-white negative film		11 … 13
Color negative film		8 … 10
Color transparency film (slide)		6 … 8
Reproduction Medium		**Dynamic Range [EV / f-stops]**
Monitor		8 … 10
Digital projector		9 … 12
Slide projector		8
Photo paper		4 … 6
Photo printer		5 … 8

Use of the Available Dynamic Range – Optimized Workflow

Metrological analysis of both illumination and the subject make it possible for the photographer to take ideal advantage of the available dynamic range of the recording sensor and the output media right from the start. Adaptation by means of tedious post-processing is unnecessary and the fast-paced workflow associated with digital photography remains unimpeded. Suitable measuring functions include:

Contrast measurement:
subject contrast from the brightest to the darkest areas of the subject with detail

Mean value generation:
based on measured values from important areas of the subject

Zone measurement:
assignment of brightness values to defined gray values

The Histogram

The histogram depicts the static distribution of an image's tonal values. Relative to brightness, the camera arranges all of the pixels along a horizontal scale from 0 (black) to 255 (white). The height of the individual line indicates the number of pixels of identical brightness. The fine lines which are very close to each other may result in a gentle curve, a jagged mountain, a picket fence or a combination of any two or all three. A histogram provides information regarding the distribution of tonal values within the image, but does not offer any indication of lighting conditions, the ambient light to flash ratio or whether or not the object is correctly illuminated. An external exposure meter is used to this end in order to achieve best possible and above all repeatable, results as quickly as possible.

DIGISIX 2 & DIGIFLASH 2

With their compact, handy and lightweight design

coming in at just 40 grams, DIGISIX 2 and DIGIFLASH 2 are an ideal enhancement for minimalistic, but nevertheless demanding photographic equipment. They expand the measuring functions of manually adjustable cameras to include incident light measurement, of which better exposure can be achieved for unusual subject contrast.

Integrated contrast measurement also indicates whether or not subject contrast, i.e. the difference between the brightest and darkest part of the subject, can be managed by the sensor or the film. With its additional flash function, the DIGIFLASH 2 is the smallest flash exposure meter in its class.
The timer for time exposures, temperature monitoring for the camera bag and the clock with alarm round out the functions of the DIGISIX and the DIGIFLASH 2 and transform them into indispensable tools for the dedicated photographer.

The combination of precision digital measuring technology and a clear-cut analog display is entirely unique. The measured exposure value is transferred to the settings window, after which all usable f-stop/shutter speed combinations can be viewed at a glance – thus paying homage to traditional analog exposure meters.

Specifications

Comprehensive metering methods –
incident and reflected light measurement.

Flash control –
flash measurement with adjustable synchronization speed (DIGIFLASH 2 only).

Subject contrast control –
contrast display in 1/3 f-stop increments.

Precision measurement and display –
exposure value is ascertained and displayed in 1/3 increments.

Clear-cut display –
all possible f-stop/shutter speed combinations at a glance.

Timer for time exposures –
timer is adjustable from 1 second to 30 minutes.

Camera bag temperature monitoring –
temperature measurement and min. - max. value storage.

Reliable reminders –
integrated clock with alarm function.

Measured value memory –
last measured value and function are retained.

Individualized adaptation –
entry of equipment-specific correction values: ± 3 correction values in 1/3 increments.

Diverse warnings –
battery level, over-range or under-range.

DIGIPRO F2

With its compact design, outstanding diversity and high performance,

the DIGIPRO F2 is the ideal standard tool for many professional photographers, demanding amateurs and filmmakers. The included technology and features are high quality, and operation is clear-cut and easy to understand. The universal DIGIPRO F2 is laid out for use in the studio, as well as outdoors. It makes quick work of incident and reflected light measurements for flash and ambient light, displays mixed lighting conditions as well as required multiple flashes, and performs contrast measurements. The values are displayed in full, 1/2 or 1/3 increments depending on the selected setting. The DIGIPRO F2 masters all common lighting situations for analog and digital photography, as well as filmmaking, with outstanding precision and time-tested quality.

Specifications

Comprehensive metering methods – incident and reflected light measurement with adjustable measured value display in full, 1/2 or 1/3 increments.

Precise measurement and display –
repetition accuracy of ± 0.1 EV, measured value display in 1/10 increments.

Flexible ambient light measurement –
aperture or shutter priority pre-selection as well as exposure value display.

Subject contrast control –
analog contrast display in half f-stop values.

Comprehensive flash measurement –
flash exposure measurement (cord/non-cord) with adjustable synchronization speed, display of ambient light ratio and multiple flash calculation.

CINE function for filmmakers –
determination of f-stop for adjustable film speeds ranging from 8 to 64 fps, including 25 fps and 30 fps for TV, as well as correction factor for sectors deviating from 180°.

Individualized adaptation –
entry or measurement within a range of ± 7.9 correction values in 1/10 increments.

Ergonomic design –
compact housing with swivel head and one-hand operation.

Diverse warnings –
battery level, over-range or under-range.

Automatic shutdown –
most recent settings and last measured values are retained.

DIGIPRO F2

Universal Exposure Meter for Photographers

Ambient light measurement can be performed with either aperture or shutter priority pre-selection, as well as with exposure values. The removable diffuser can be used to switch back and forth between incident and reflected light measurement. After measurement has been completed, f-stop/shutter speed combinations can be queried by pressing the value keys. Measured values are displayed digitally in 1/10 increments, and f-stop values appear at the analog scale in 1/2 increments. If the measuring key is pressed and held in the shutter pre-selection and exposure value function, contrast range is ascertained and displayed at the f-stop scale – an ideal function for matching the subject's contrast range to the recording medium.

In the case of flash measurement, this can be triggered manually, wirelessly or by means of a synchronizing cable. After measurement has been completed, the f-stop value for the specified synchronizing speed appears at the display. This is displayed at the analog f-stop scale along with the f-stop value for the ambient light ratio. The relationship between flash and ambient light can be influenced by changing synchronization speed, making it possible to adjust fill-in flash or soften ambient light. If the measurement indicates that the desired working aperture is not possible with a single flash, it can be adjusted with the upper value key. The digital time display is then replaced with an indicator showing the number of flashes required for the working aperture.

Simple CINE Meter for Filmmakers

Film speed is specified in the CINE mode. An open aperture angle which deviates from 180° can be taken into account by calculating and entering the filter factor as a correction value (COR). After measurement has been completed, the f-stop value is displayed digitally in 1/10 increments and appears additionally at the analog f-stop scale rounded off to 1/2 increments. The cameraperson is thus provided with basic data for a correctly exposed image.

Ergonomic Design

The DIGIPRO F2 is laid out for convenient one-hand operation. Operation is simple and intuitive with just a few keys. The high-contrast LCD panel is highly legible and displays values in a clear-cut fashion. Measuring and display direction can be ideally adapted to individual requirements with the swivel head. Its compact, but nevertheless rugged design, assures that the exposure meter fits into the user's hand perfectly and accompanies the photographer through all of his tasks as an indispensable tool.

DIGISKY

The stylish, intuitive, high performance

DIGISKY is the contemporary rendition of the exposure meter. Technology and features are at their usual high levels and new standards are being set with regard to design and ease of operation. The compact DIGISKY is laid out for use in the studio as well as outdoors, and is equipped with an adjustable diffuser for flat and spherical measurements. It's capable of incident and reflected light measurements for flash and ambient light, which are displayed in full, 1/2 or 1/3 increments depending on the selected setting. The DIGISKY masters all common lighting situations for analog and digital photography, as well as for filmmaking, with outstanding precision and time-tested quality.

Ideal Exposure Meter for Photographers

Ambient light measurement can be conducted with either aperture or shutter priority pre-selection. Subject and lighting contrast can be measured as well. The contrast range is displayed in both analog and digital format. Middle, minimum and maximum values for preselected f-stop/shutter speed combinations can be queried by pressing the DATA key, and can be transferred directly to the camera for HDR photography.

Flash measurement can be triggered wirelessly by means of a synchronizing cable or via the integrated Elinchrom Skyport/Skyspeed compatible radio module. After measurement has been completed, the f-stop value for the specified synchronizing speed appears at the display along with the most effective flash ratio as a percentage.

The ratio of flash to ambient light isinfluenced when the synchronizing speed is changed and the exposure meter automatically recalculates the f-stop and the percentage of flash illumination. This function is especially interesting for adjusting fill-in flash and for softening ambient light. Up to 4 flash groups can be selected and triggered on 8 different radio frequencies in the function mode. Various shooting sets can be separated from each other in this way. If the Elinchrom RX and BXRI flash heads can have their power adjusted by radio via the exposure meter, eliminating the need of actually going to the flash head or using an additional remote control. Elinchrom Skyport Universal radio sets can be used with other flash manufacturers for convenient DIGISKY triggering and measurement.

DIGISKY

Ideal CINE Meter for Filmmakers

Film speed, open aperture angle, photometry settings and a correction factor for filters can be specified in the movie mode. The exposure value appears in an easy to interpret analog scale allowing for immediate detection of even minimal deviation from the desired illuminance, and additionally as a digital value. The large digital display can be switched back and forth between measured aperture and illuminance or luminance. Middle, minimum and maximum values for the f-stop, as well as minimum and maximum photometric values can be queried by pressing the DATA key. The cameraman is thus provided with a clear-cut display of all of the values required for a correctly exposed image.

Perfect Ergonomics

The lightweight, handy DIGISKY is laid out for convenient one-hand operation. It can be easily and intuitively operated with the help of the ring controller and just a few clear-cut keys. The 2.2" color graphic display is highly legible in both light and dark settings and allows for the representation of a clearly arranged menu structure with all information is available at a glance. Settings for three individually selectable camera profiles and a filmmaking profile can be entered in the setup menu, where display brightness, display on-time and device on-time can be changed as well, and the menu language can be set to either German or English. In keeping with the times, power is supplied by a rechargeable lithium-ion battery which is recharged via the USB port using the included power pack. The software can also be updated via the port, assuring that the DIGISKY is fully up to date even after years of use. Thanks to its compact, low-profile design and minimal weight, it can be tucked away into any shirt or pants pocket and is always on the set when needed.

Specifications

Ergonomic design – highly practical one-hand operation, function selection via the diffuser ring, easy, intuitive navigation and menu settings with the ring controller and just a few keys.

Brilliant display – large TFT color graphic display with excellent legibility even in the dark, clear-cut menu structure and complete information at a glance.

Multilingual operation –
menu language can be switched to German or English.

Comprehensive metering methods – incident and reflected light measurement with spherical or flat diffuser and adjustable measured value display in full, 1/2 or 1/3 increments.

Flexible ambient light measurement – aperture or shutter priority preselection with exposure value display and additional digital and analog display of measured value deviation from the selected exposure level.

Contrast range control – measurement of subject and lighting contrast, display of minimum, maximum and mean values for preselected f-stop/shutter speed combinations.

Comprehensive flash measurement – flash exposure measurement (cord/non-cord/radio) with adjustable synchronization speed, display of flash ratio and Elinchrom Skyport/Skyspeed compatible radio module.

Convenient Elinchrom control – assignment of 4 flash groups to 8 different radio frequencies, separate and combined triggering, remote controlled flash power.

CINE function for filmmakers – determination of f-stop for film speeds ranging from 2 to 1000 fps and open aperture angles from 45° to 315°, measurement of illuminance or luminance.

Individualized correction –
entry of correction values: EV ± 5 in 1/10 increments.

Dynamic change – amongst various cameras by means of presettings and selection of 3 camera profiles and a filmmaking profile.

STARLITE 2

The specialized, high performance STARLITE 2

is the top-of-the-line model for semiprofessional and professional users. 1° spot metering allows for detection of the smallest differences in brightness at a distance with the optical viewfinder, as well as for precise exposure.
The compact STARLITE 2 is laid out for use in the studio as well as outdoors and is equipped with an adjustable diffuser for flat and spherical measurements. It's capable of incident and reflected light measurement for flash and ambient light to determine photographically relevant exposure values which are displayed in 1/10 or 1/2 stop increments depending on the selected setting. The STARLITE 2 masters all common lighting situations for analog and digital photography, as well as filmmaking, with outstanding precision and time-tested quality.

Outstanding Exposure Meter for Photographers

Ambient light measurement can be performed with either aperture or shutter priority pre-selection, as well as with exposure values. Subject and lighting contrast can be measured as well. Contrast range is displayed in analog format in 1/2 f-stops. A tonal value can be generated on the basis of up to 9 measurements by pressing the AVR key and displayed in both analog and digital format.

Ergonomic Designed Meter

The STARLITE 2 is laid out for convenient one-hand operation. It can be ideally preconfigured as an exposure meter or a CINE meter by means of the DIP switches in the battery compartment with standard settings or advanced functions, after which it can be operated automatically with the rotary knob and just a few clear-cut keys. The high contrast display, which is automatically backlit if required, is highly legible in both light and dark settings. Thanks to compact, low-profile design, its minimal weight and a rubberized grip, the STARLITE 2 fits the hand perfectly. The splash-proof housing ensures carefree outdoor use.

STARLITE 2

Ideal for Flash Measurements

The STARLITE 2 is capable of measuring individual flashes, calculating multiple flash illumination and analyzing flash and ambient light – even with several flash units in combination. With the help of multiple flash calculation, the STARLITE 2 automatically calculates the required number of flashes, if the flash unit's power would be inadequate with a single flash.

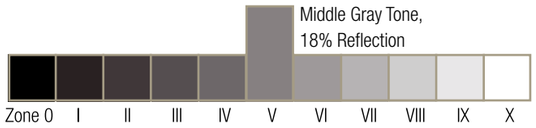
Top Quality CINE Meter for Filmmakers

Film speed, open aperture angle in 5° steps and photometry settings can be selected in the CINE operating mode. The large digital display can be switched back and forth between measured aperture and illuminance or luminance for ambient light and flash. Contrast and mean value measurement is available as well. The cameraman is thus provided with a clear-cut display of all of the values required for a correctly exposed photo. The light technician has an efficient tool for adjusting light effectively.

Effectively Composed, Perfectly Illuminated –

with the Zone System

With the STARLITE 2, final visual results can be viewed for creative planning before the image is recorded. Use of an 11-stage zone system makes it possible to evaluate deviating brightness within the subject in consideration of exposure, so adequate tonal values and detail are present even in the bright and dark areas of the subject in order to ensure exact reproduction. As a standard feature, acquired measurement results correspond to the middle gray tone (18% reflection) in the zone V tone scale. All of the details which are important for an image recording can then be individually measured on this basis.



Specifications

Special metering methods – reflected light measurement as 1° spot metering or 5° selective metering, incident light measurement with spherical or flat diffuser, measuring probe with optical viewfinder.

Precise measurement and display – repetition accuracy: ± 0.1 EV, exposure time for standard series adjustable in full or 1/2 increments, digital display of measured values in 1/10 increments, analog display of measured values in 1/2 f-stops.

Flexible ambient light measurement – aperture or shutter priority pre-selection and exposure value display, digital display in 1/10 increments and analog f-stop display in 1/2 increments.

Contrast range control – measurement of subject and lighting contrast, display of contrast at the analog scale as f-stops in 1/2 increments.

Mean exposure – a mean value generated from 9 measurements is displayed digitally in 1/10 f-stop increments, as well as at the analog scale rounded off to 1/2 f-stop values along with the range of measured values.

Zone system – subject contrast management by means of measurements in accordance with the zone system, direct display of measured values at the zone scale.

Comprehensive flash measurement – flash exposure measurement (cord/non-cord) with adjustable synchronization speed, display of ambient light ratio and multiple flash calculation.

CINE function for filmmakers – determination of f-stop for film speeds ranging from 2 to 360 fps and open aperture angles from 5° to 355°, measurement of illuminance or luminance.

Dual ISO sensitivities – conversion of f-stop/shutter speed combinations by simply pressing a key.

Individualized correction – entry or measurement within a range of ± 9.9 correction values in 1/10 steps.

Unique ergonomics – highly practical one-hand operation, function selection via the diffuser ring, settings via rotary knob and just a few keys, advanced functions via DIP switches.

Automatic display illumination – assures good legibility in dark settings.

Diverse warnings – battery level, over-range or under-range.

TECHNICAL DATA

Model	DIGISIX 2	DIGIFLASH 2	DIGIPRO F2	DIGISKY	STARLITE 2
Item number	H262A	H263A	H261A	H260A	H258A
Ambient light	■	■	■	■	■
Incident light metering method	■	■	■	■	■
Reflected light metering method	■	■	■	■	■
Aperture or shutter priority pre-selection			■	■	■
Contrast measurement	■	■	■	■	■
Middle value generation				■	■
Zone measurement					■
Flash (non-cord)		■	■	■	■
Flash (non-cord – radio)				Elinchrom (Skyport and SKYPORTspeed)	
Radio groups/channels				All, 1 to 4 / 1 to 8	
Flash (cord)			■	■	■
Ambient light ratio display			■	■	■
Calculation of multiple flashes			■		■
Illuminance				0.5 to 199900 lx 0.05 to 50000 fc	0.5 to 199,900 lx 0.05 to 50000 fc
Luminance				0.2 to 30,000 cd/m² 0.05 to 9000 fL	0.2 to 30,000 cd/m² 0.05 to 9000 fL
Flash illumination intensity					2 to 30,000 lx*s 0.2 to 3000 fc*s
Flash luminance					0.3 to 1800 cd*s/m² 0.1 to 500 fL*s
Measuring sensor	sbc silicon photodiode	sbc silicon photodiode	sbc silicon photodiode	2 color corrected silicon photodiodes: 1 for incident and 1 for reflective light measurement	2 color corrected silicon photodiodes: 1 for incident and 1 for reflective light measurement
Swivel head			■		■
Spherical diffusor (photography)	■	■	■	■	■
Flat diffusor (reproductions and lighting technology)				■	■
Angle of acceptance for reflected light measurement	Approx. 25°	Approx. 25°	Approx. 25°	20°	
Reflected light measurement, 1° and 5°					■
Ambient light measuring range (at ISO 100/21°)	EV 0 to 18	EV 0 to 18	EV -2.5 to 18	EV -2.5 to 18.5	EV -2.5 to 18
Reflected light measurement, 5°					EV 0 to 18
Reflected light measurement, 1°					EV 2 to 18
Repetition accuracy			± 0,1 EV	± 0,1 EV	± 0,1 EV
Exposure time	1/2000 sec. to 4 min.	1/2000 sec. to 4 min.	1/8000 sec. to 60 min.	1/8000 sec. to 30 min.	1/8000 sec. to 60 min
f-stops	f/1 to f/32	f/1 to f/32	f/1 to f/90.9	f/0.5 to f/128	f/0.5 to f/128

TECHNICAL DATA

Model	DIGISIX 2	DIGIFLASH 2	DIGIPRO F2	DIGISKY	STARLITE 2
Flash measuring range (at ISO 100/21°)		f/2 to f/32	f/1 bis f/90	f/0.5 to f/128	f/1.0 to f/128
Reflected light measurement, 5°					f/1.4 to f/128
Reflected light measurement, 1°					f/2.8 to f/128
Flash synchronizing time (measurement time)		1 to 1/500 sec. incl. 1/90 sec.	1 to 1/1000 sec. incl. 1/90	1 to 1/1000 sec. incl. 1/90	1 to 1/1000 sec. incl. 1/90
CINE values			8 fps to 64 fps	2 fps to 1000 fps	8 fps to 64 fps
			incl. 25 fps to 30 fps (TV)	incl. 25 fps to 30 fps (TV)	incl. 25 fps to 30 fps (TV)
Correction value	± 3.0	± 3.0	± 7.9	± 5.0	± 9.9
Extension factors			1.0 to 240		
Film sensitivity	ISO 6 to 3200 in 1/3 increments	ISO 6 to 3200 in 1/3 increments	ISO 3.2 to 8000 in 1/3 increments	ISO 3 to 16000 in 1/3 increments	ISO 3 to 8000 in 1/3 increments
Measured value memory	■	■	■	■	■
Timer	1 sec. to 30 min.	1 sec. to 30 min.			
Clock	Switchable between 12 and 24 hours	Switchable between 12 and 24 hours			
Alarm function	■	■			
Accuracy	5 min. per year	5 min. per year			
Thermometer	°C or °F can be selected	°C or °F can be selected			
Measuring range	-15 to 70 °C or 5 to 160 °F	-15 to 70 °C or 5 to 160 °F			
Measuring accuracy	± 2 °C or ± 4 °F	± 2 °C or ± 4 °F			
Min.-max. memory	■	■			
USB 2.0 port				■	
Firmware update				■	
Charging function				■	
Memory				1 filmmaking and 3 camera profiles	

Display	Digital LCD panel and setting ring	Digital LCD panel and setting ring	Digital LCD panel	TFT color graphic display	Digital LCD panel
Background illumination				■	■
Adjustable LCD brightness				50 to 100 % in steps of 10 %	
Adjustable display shutdown time				Off, 30, 45 or 60 sec.	
Selectable language				German, English	
Battery / rechargeable battery	3 V lithium battery, CR 2032	3 V lithium battery, CR 2032	1.5 V mignon, type AA	3.7 V, 890 mAh rechargeable lithium-ion battery	1.5V mignon, type AA
Automatic battery monitoring	■	■	■	■	■
Rechargeable battery life				Without display/device shutdown 8 hours, Standby:	
				45 sec., shutdown: 180 sec., Approx. 4 weeks	
Charging time with charger / USB				3 hours / 30 hours (not recommended)	
Automatic shutdown			120 sec.	Off, 60, 120, 180 or 240 sec.	120 sec.
Operating temperature	-10 to 60 °C / 14 to 140 °F	-10 to 60 °C / 14 to 140 °F	-10 to 50 °C / 14 to 140 °F	-10 to 50 °C / 14 to 122 °F	-10 to 50 °C / 14 to 122 °F
Dimensions	75 mm x 50 mm x 23 mm	75 mm x 50 mm x 23 mm	150 mm x 65 mm x 19 mm	139 mm x 60 mm x 16 mm	164 mm x 66 mm x 26 mm
	2.95 x 1.97 x 0.91 inch	2.95 x 1.97 x 0.91 inch	5.91 x 2.56 x 0.75 inch	5.47 x 2.36 x 0.63 inch	6.46 x 2.6 x 1.02 inch
Weight	40 g / 0.088 lbs incl. battery	40 g / 0.088 lbs incl. battery	100 g / 0.22 lbs without battery	100 g / 0.22 lbs incl. rechargeable battery	195 g / 0.429 lbs without battery
Included accessories	Case, carrying strap, battery and	Case, carrying strap, battery and	Case, carrying strap, battery and	Case, carrying strap, rechargeable battery, charger,	Case, carrying strap, battery and
	operating instructions	operating instructions	operating instructions	USB cable, CD with operating instructions	operating instructions
Optional accessories	Mounting clip for camera shoes, order no. V069A	Mounting clip for camera shoes, order no. V069A		Rechargeable lithium-ion battery, order no. V070A	

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